

PRELARVAE OF PTYCTIMID ORIBATIDS (II) *PHTHIRACARUS CLEMENS CLEMENS* AOKI (ACARIDA: ORIBATIDA)

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Synopsis

SUZUKI, Keiichi (5-25-3 Senju, Adachi-ku, Tokyo 120, Japan) : Prelarvae of ptyctimid oribatids. (II) *Phthiracarus clemens clemens* AOKI (ACARIDA: Oribatida). *Acta arachnol.*, 31: 35-41 (1982).

Prelarval morphology of Japanese *Phthiracarus clemens clemens* AOKI, 1963 is reported. In the present study it was revealed that phthiracarid prelarvae are not so different from one another at the generic level. Ptyctimid prelarvae were divided into three types based on their morphological character states.

Introduction

The Japanese *Phthiracarus* consists of *Ph. japonicus* AOKI, 1958, *Ph. clemens clemens* AOKI, 1963 and *Ph. clemens kyushuensis* AOKI, 1980. The present study is the second report on the Japanese ptyctimid prelarvae.

Though HAMMEN (1963) stated that *Hoplophthiracarus pavidus* as well as the known other phthiracarid species generally contain prelarvae, the probability of collecting prelarvae is low in phthiracarids by my experiences and also lower in contrast to oribotritiids.

I. Morphology of Prelarvae

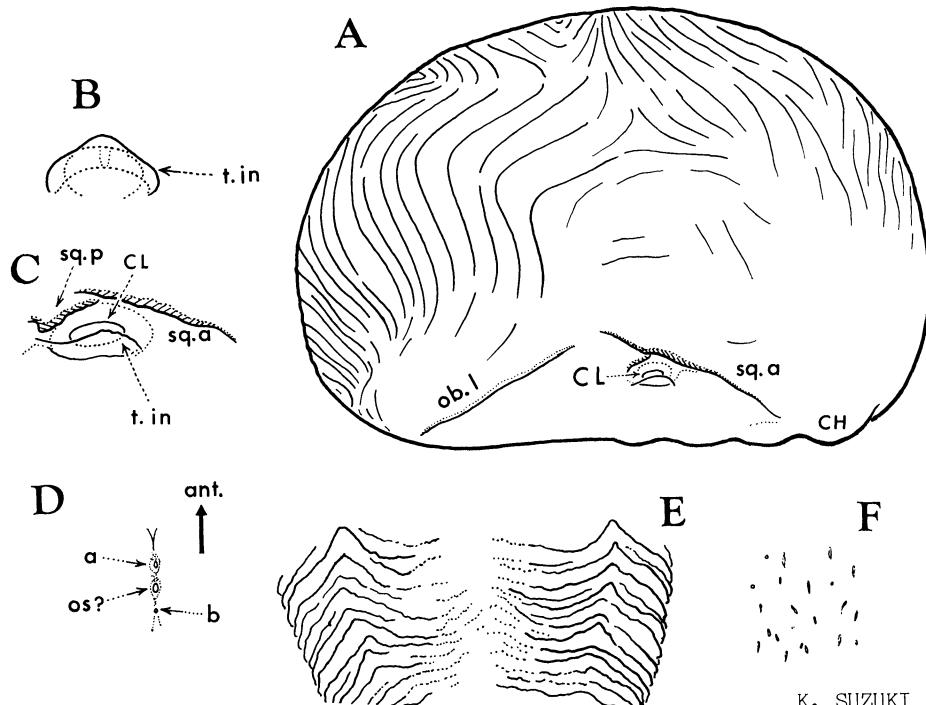
Material examined.—*Ph. clemens clemens* AOKI, 1963: Two adults each with one prelarva. The specimens collected from humus of *Quercus mongolica* var. *grosseserrata* in Senjoh-ga-hara, Nikko (1,400 m above sea level), Tochigi-kén, 19760919, LI-II [C392365-43-11]. K. SUZUKI leg.

Measurement.—For two materials, length: 170-175 μm ; width: 140-142 μm .

Habitus and colour.—Oval in shape: the ventral side rather flat, but the

dorsal side well swollen (Fig. A). Cuticle soft and pigmented with very pale brown colour. There is no granules. Since the specimens examined here rather at an early stage of the prelarva, nervures, wrinkles and the vestiges of the appendages obscure, but the CLAPARÈDE's organ *CL* and the oblique plicae *ob. l*, *sq. a* and *sq. p* distinct. The wrinkles not so strong, but rather faint.

Dorsal and lateral side.—Many faint wrinkles can be seen: they flow transversally, never longitudinally like in *Oribotritia*. Each wrinkle of the dorso-lateral part curved anteriorly like a wave crest (in Fig. E this state is drawn; pay attention to the fact that the wave crest-like lateral form of the wrinkles does not project dorsally). This pattern of the wrinkles can not be found at anterior 1/3 and posterior 1/3. In these two parts the wrinkles rather irregular. The mesal area of dorsal part has not distinct wrinkles, but faint ones. In the lateral aspect the wave crest-like pattern also observed at posterior half (Fig.



K. SUZUKI

Figs. A-F. Prelarva of *Phthiracarus clemens clemens* AOKI, 1963.

A. Lateral aspect. B. Lateral aspect of CLAPARÈDE's organ. C. Ventral aspect of the same organ in Fig. B. D. Mouth part. E. Pattern of the wrinkles of the dorsal side. F. Integument of the frontal face; *ant.* means the anterior side.

A). The anterior ventral half of the body as well as the remaining ventral half has not the wrinkles, but in the former part very minute and rather elongate pits roughly distributed (Fig. F). The long and discernible plicae *sq. a* and *ob. l* are present. The plica *sq. a* somewhat shorter than the lateral oblique plica *ob. l*. The two plicae close, but never touch each other at the top ends. Beneath the anterior two plicae somewhat complex CLAPARÈDE's organ *CL* located in a shallow hollow, the border of which is illustrated with a dotted line in Fig. C and the organ rather depressed oval. Inferior small tectum *t. in* covers about 1/2 of the ventral side, so the *CL* not observed in the ventral view. The middle part of the margin of *t. in* slightly projected laterodorsally (Figs. B & C). The lateral oblique plica *ob. l* well agrees with that of *Ph. anonymum* in the form and its location. Contours of the vestiges of the appendages not so distinct, but in the lateral aspect weak four swollen parts barely detected.

Ventral side.—The faint vestigial appendages, namely chelicerae *CH*, palps *Pp*, leg I *PI* and leg II *PII*, can be found: the borders of the appendages very obscure, but only their outer margins can be observed due to rather deep pigmentation. No structure exists in the sternal area. This area rather flat. Among vestigial appendages *CH* most prominent (Fig. A). Just behind the end of the commissure line of *CH*, three very minute and doubtful pits found, being longitudinally arranged in a row (Fig. D). Among three minute pits *a*, *os?* and *b* it is uncertain which is the orifice of the oesophagus, but in my figure the middle pit is marked with *os?* because of its largest size. Are other pits, *a* and *b*, homologous to those of *steganacarus?* In my specimens any lylifissure and gland can not be found, because the specimens are rather young as prelarva.

II. Discussion

1. Comparison with other phthiracarid prelarvae

We have the knowledge on the prelarvae of the three species of *Phthiracarus*, *Ph. anonymum* GRANDJEAN, 1934, *Ph. globosus* (KOCHE, 1884) and *Ph. italicus* (OUDEMANS, 1900) in detail. In comparison with these species it can be resumed that the differences of the morphological character states are not so clear, and these prelarvae resemble one another except their size. Though my specimens are somewhat at an early stage as prelarva, they well agree with *Ph. anonymum* in several character states. In spite of the resemblance *Ph. clemens clemens* is distinguishable from the other species in the several character states: (1) the

presence of the oblique plica *sq. a* and the short plica *sq. p*, (2) the arrangement of pits *a*, *b* and the orifice of the oesophagus *os?*, (3) the existence of the minute elongate pits in the frontal side. The size of these species also useful as the additional information:

Phthiracarus clemens clemens —172 μm (on average for two)

Ph. anonymum —161 μm (by calculation from GRANDJEAN's illustration in 1940)

Ph. globosus —250 μm (LIONS, 1973)

Ph. italicus —160 μm (LIONS, 1973)

2. On ptyctimid prelarvae

The prelarval records of Ptyctima are not so many, because finding of prelarvae relies on the rather rare opportunity of capturing adults with the prelarvae. By culturing, the prelarval collection can be get, but the culturing oribatids is not so easy in the light of the technical problems at present. Based on the data up to now it is able to divide the ptyctimid prelarvae into several types. Before dividing, it is necessary to show the list of known ptyctimid prelarvae:

1. Phthiracaridae

<i>Hoplophora contractilis</i>	CLAPARÈDE, 1868
<i>Hoplophthiracarus pavidus*</i>	HAMMEN, 1963
<i>Phthiracarus anonymum**</i>	GRANDJEAN, 1940
<i>Ph. baloghi</i>	FEIDER & SUCIU, 1957
<i>Ph. globosus</i>	LIONS, 1973
<i>Ph. italicus*</i>	LIONS, 1973
<i>Ph. clemens clemens*</i>	SUZUKI, 1982 (this paper)
<i>Steganacarus magna</i>	NICOLET, 1885
<i>S. striculus</i>	FEIDER & SUCIU, 1957
<i>S. magnum</i>	FEIDER & SUCIU, 1957 (= <i>S. magna</i>)
<i>S. travéi*</i>	LIONS, 1968
<i>S. anomalus**</i>	BERNINI, 1971
<i>Tropacarus pulcherrimus</i>	FEIDER & SUCIU, 1958

2. Oribotritiidae

<i>Oribotritia serrata</i>	FEIDER & SUCIU, 1958
<i>O. berlesei*</i>	GRANDJEAN, 1962 (= <i>Tritia decumana</i> KOCH, 1883)
<i>O. chichijimensis*</i>	SUZUKI, 1982
<i>Astrotritia dentata*</i>	SUZUKI, 1982 (in press)
<i>A. kinabaluensis**</i>	RAMSAY & SHEALS, 1969

3. Euphthiracaridae

<i>Rhysotritia ardua*</i>	LIONS, 1967
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In this list the species name with a single asterisk* means the detailed description and double asterisks** means the somewhat detailed description.

The ptyctimid prelarvae can be divided into three types based on their morphological character states as follows:

General characters: Calyptostase. Oviparity, aparity (?)¹⁾ and/or viviparity¹⁾. There is a pair of CLAPARÈDE's organ. The dorsum and/or lateral side more or less have/has wrinkles. A pharyngeal filament is present.

A) Phthiracaridae (P-type)

The followings are phthiracaridid prelarval character states (basic plan).

- (1) The cuticle is soft and very weakly pigmented with brown.
- (2) The glands g_{1-3} are present. Sometimes these are reduced to two or one.
- (3) The body is dorsally swollen, but the ventral side is rather flat.
- (4) The dorsal and the lateral sides have faint wrinkles. The dorsal wrinkles show the pattern similar to that in my Fig. A. The ventral side, sternal and ventral areas without wrinkles.
- (5) The vestigial appendages are not obvious, but CH is rather clear.
- (6) The minute pit for oesophagous os is present near t_1 .
- (7) The minute pits a and b are usually present.
- (8) The lateral oblique plica $ob. l$ is present.
- (9) The anterior oblique plica $sq. a$ is usually present.
- (10) The posterior oblique plica $sq. p$ is usually present.
- (11) CLAPARÈDE's organ is present and dorsally protected by the minitectum $t. in.$
- (12) The minute lyrifissure ly is located just behind the CLAPARÈDE's organ.

B) Oribotritiidae (O-type)

The oribotritiid prelarval character states (basic plan) are as follows:

- (1) The cuticle is very hard and well pigmented with brown.
- (2) The body is elongate oval, but the anterior end is sometimes rather flat.
- (3) A part of dorsal and whole the lateral sides have well developed wrinkles. These wrinkles are parallel to each other in lateral side, but in the caudal portion they are irregularly arranged like the flow of lava. Sometimes dorsal wrinkles are very obscure.
- (4) The rostral visor R and/or the rostral projections rc is/are present.
- (5) Vestiges of appendages are generally distinct and cheliceral vestiges CH and palpal vestiges are usually clear in their shapes.
- (6) The chelicera and a part of the lateral side of the body are decorated with granules.
- (7) The chelicera has usually the dent k .

¹⁾ The possibility of the two modes are high, because the females often have large and well developed prelarvae in her hysterosoma. And the presence of larva in the hysterosoma has been detected by TRAVÉ (1966) in *Rhysotritia clavata sextiana*.

- (8) The orifices *os*, *a* and *b* are usually absent.
- (9) The CLAPARÈDE's organ is large and never protected by the inferior minitectum *t. in*, but the anterior and the posterior sides are held by *na* and *np*.
- (10) The lateral side is provided with the stout horizontal plicae *sq. a* and *sq. p*, and the vertical plica *sm*.
- (11) The ventral plate area is rather flat (here named *EV*) and without plicae.
- (12) The posterior part of the lateral side has the vertical stout plica *z*. In front of *z* small incision *n* is also present.
- (13) Generally well developed and carina-like plicae are present.
- (14) There is a projection *mp* behind *PIII*. Under the *mp* two filaments *ny* and *vx* are present.

C) Euphthiracaridae (E-type)

The prelarvae of this family show the following character states²⁾:

- (1) The cuticle is soft and not pigmented with brown.
- (2) Elongate oval, rather rectangular with round anterior and posterior margin.
- (3) The body wrinkles are very few. The wrinkles on dorsal side are faint.
- (4) The vestiges of appendages are absent.
- (5) The oesophageal orifice *os* is present.
- (6) The minute pits *a* and *b* are present.
- (7) The anterior part (the rostral part) has a visor-like structure *I* (LIONS' "sillon frontal").
- (8) A long furrow (a latero-frontal furrow) *lf* runs on the lateral sides.
- (9) CLAPARÈDE's organ is small and has a conical tube in its centre.
- (10) Near CLAPARÈDE's organ three oblique plicae or carinae are present: LIONS' *ob.* *l₁* and *uob.* *l₃* are maybe homologous to *sq. a* and *sq. p* in Oribotritiidae, respectively.
- (11) A transverse depression *y* exists at middle part of ventral side.
- (12) Several distinct wrinkles can be detected, namely *v*, *x* and *A*.
- (13) A single orifice of the gland *g* is located in front of *CL*.

Ptyctima contains 4 superfamilies, namely PROTOPLOPHOROIDEA, MESOPLOPHOROIDEA, PHTHIRACAROIDEA and EUPHTHIRACAROIDEA. In the above-mentioned list I divided the ptyctimid prelarvae into three types, but it is incomplete, because the prelarvae of two primitive superfamilies are out of discussion due to the lack of the prelarval knowledge on these superfamilies. The two groups are very important, because their primitiveness offers good data for the analysis of the character evolution in Ptyctima. The discovery of prelarvae of the groups is expected in such a sense.

²⁾ The knowledge as to euphthiracarid prelarva is only on *Rhysotritia ardua* as far as I know (LIONS, 1967). The present list is as to *R. ardua* only.

摘要

鈴木恵一 (120 東京都足立区千住 5-25-3) : ササラダニ類完可折群前幼生の形態学 (2) (ダニ目: ササラダニ類).

ササラダニ類の完可折群前幼生に関する形態学的調査をツルギイレコダニ *Phthiracarus clemens clemens* AOKI, 1980 について行った。イレコダニ科は、完可折群の中で最も多くの前幼生が報告されているが、詳細な形態学的見解は少ない。本研究で、イレコダニ科の前幼生は属レベルにあってもあまり差異のないことがわかった。これは、それだけこの科における均質性を裏づけるものである。完可折群内の他の前幼生について通観してみると、その形態学的特徴を基礎に3つの異なるタイプに分割でき、しかもこれが成体を基礎にした従来の分類と対応していることがわかった。つまり、それぞれの科、特にイレコダニ科、タテイレコダニ科、ヘソイレコダニ科の標識そのものと考えられる。

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